

In the Specification:

Please amend the paragraph that begins on page 9, line 9 and ends on page 10, line 2 as follows:

During operation, the cascaded resonant second-order sections 12 - 24 may provide low pass filter functions and have characteristic frequencies ( $CF_j$ ) that are exponentially tapered from the beginning of the cascade to the end of the cascade. The outputs from the resonant low pass second-order sections 12 - 24 are double differentiated in the  $(j\omega/CF_j)^2$  blocks 26 - 36 to create  $CF$ -normalized bandpass frequency-response characteristics at each stage of the silicon cochlea.

**In other embodiments, the differentiators 26 - 36 may provide a unity differentiation**

**function.** The envelope energy in each of these stages is extracted by the envelope-detector (ED) blocks 38 - 48 and fed to a kernel that computes a spatially-filtered version of these energies.

The kernel 50 weights local energies more strongly than energies from remote stages. The output of the kernel,  $I_j$ , is then passed through nonlinear block,  $NL_j$  (52). The NL block outputs a large value for the resonant gain,  $Q_j$ , if the energy is low, and a small value for  $Q_j$ , if the energy is high, thus, performing gain control. The attack and release dynamics of the gain control arise from charging and discharging time constants in the envelope detector respectively, and may be tapered with the  $CF$ 's of the cochlear stages. For clarity, the architecture is only shown in detail for stage  $j$  of the cascade, but every stage of the cascade has similar  $NL_j$  blocks that operate on local estimates of envelope energy output by the kernel.